



American National Standard/
American Dental Association
Standard No. 1084

Reference Core Data Set for Communication Among Dental and Other Health Information Systems

ADA American
Dental
Association®

Standards Committee on Dental Informatics

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AMERICAN DENTAL ASSOCIATION STANDARD NO. 1084 FOR REFERENCE CORE DATA SET FOR COMMUNICATION AMONG DENTAL AND OTHER HEALTH INFORMATION SYSTEMS

The ADA Standards Committee on Dental Informatics (SCDI) has approved ANSI/ADA Standard No. 1084 for Reference Core Data Set for Communication among Dental and Other Health Information Systems. Working Groups of the ADA Standards Committee on Dental Informatics (SCDI) formulate this and other standards and technical reports for the application of information technology and other electronic technologies to dentistry's clinical and administrative operations. The ADA SCDI has representation from appropriate interests in the United States in the standardization of information technology and other electronic technologies used in dental practice. The standard was forwarded to the American National Standards Institute with a recommendation that the standard be approved as an American National Standard. Approval of ADA Standard No. 1084 as an American National Standard was granted by the American National Standards Institute on May 21, 2019.

The ADA SCDI thanks the members of the task group and the organizations with which they were affiliated at the time the specification was developed:

Amit Acharya (Chairman), Marshfield Clinic, Marshfield, WI; Terry G. O'Toole (Chairman), Past Director, Dental Informatics, Department of Veterans Affairs, Washington DC; Matt Ackerman, Carestream Dental, Atlanta, GA; Rickland G. Asai, Individual Representative, Portland, OR; Stephen Bergen, American College of Prosthodontists, West Orange, NJ; Dawn Christodoulou, XLDent, Loretto, MN; Kenneth Chung, Individual Representative, Milwaukie, OR; Zachary Church, Henry Schein Practice Solutions, American Fork, UT; Gyle Gale, Henry Schein Practice Solutions, American Fork, UT; Stephen Glenn, Individual Representative, Tulsa, OK; Douglas Gordon, Individual Representative, Pinole, CA; Michael S. Honeycutt, Document Storage Systems, North Palm Beach, FL; Richard A. Huot, Beachside Dental Consultants, Vero Beach, FL; Molly Jenkins, Defense Health Agency, Falls Church, VA; Ray S. Jeter, Augusta University-Dental College of Georgia, Augusta, GA; Mark W. Jurkovich, Health Partners, Minneapolis, MN; Jonathan Knapp, Individual Representative, Bethel, CT; Rudolph Liddell, Individual Representative, Brandon, FL; John A. Martin, Previser Corporation, State College, PA; Jean Narcisi, American Dental Association, Chicago, IL; Kishore Shetty, University of Chicago, Escondido, CA; Corey Stein, Western University of Health Sciences, Pomona, CA; Lynne VanArsdale, OrthoFi, Inc. Denver, CO; and Gregory G. Zeller, Individual Representative, Timonium, MD.

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FOREWORD

(This Foreword does not form a part of the American Dental Association Standard No. 1084 for Reference Core Data Set for Communication among Dental and other Health Information Systems.)

In 1992, there was interest in the standardization of clinical information systems related to electronic technology in the dental environment. After evaluating current informatics activities, a Task Group of the ANSI Accredited Standards Committee MD156 (ASC MD156) was created by the ADA to initiate the development of standards, guidelines, and standards on electronic technologies used in dental practice. In 1999, the ADA established the ADA Standards Committee on Dental Informatics (SCDI). The ADA SCDI is currently the group that reviews and approves proposed American National Standards (ANSI approved) and standards developed by the standards committee's working groups. The ADA became an ANSI accredited standards organization in 2000.

The scope of the ADA SCDI is:

“To promote patient care and oral health through the application of information technology to dentistry’s clinical and administrative operations; to develop standards, specifications, standards, and guidelines for: components of a computerized dental clinical workstation; electronic technologies used in dental practice; and interoperability standards for different software and hardware products which provide a seamless information exchange throughout all facets of healthcare.”

This standard was prepared at the request of the late Dr. Mark Diehl, chairman, ADA SCDI Subcommittee on Clinical Informatics, by SCDI Working Group 11.9 on Core Reference Data. The SCDI Working Group 11.9 original chairman was Dr. Amit Acharya and Dr. Terry O’Toole as vice chair. Dr. O’Toole assumed the role of chairman in February 2017 with Dr. Ray Jeter as vice chair.

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1.0 Rationale

The Reference Core Data Set (RCDS) provides for the structured electronic data elements to support key information exchange among and between dental and other health care settings. This includes the electronic sharing of essential patients' demographic and dental encounter/clinical data in a structured, computable format between dental or other health care venues.

2.0 Scope

The standard provides a technical specification to extract, format and transmit essential patients' demographic and dental and medical encounter and clinical data between one dental information system to another dental or medical health information system to support key syntactic and semantic information exchange.

The standard provides a list of pertinent data fields from the dental record about the patients (RDCS) that the health information system vendors can reference to internally map and extract information from their proprietary dental information system's data schema. Using the Health Level 7 (HL7) Consolidated-Clinical Document Architecture (C-CDA) standard the vendor can then generate a machine-interpretable (Extensible Markup Language (XML) describing content) as well as human-readable (Hyper Text Markup Language (HTML) describing the presentation) Oral Health Continuity of Care Document (OH-CCD) to achieve electronic information exchange between clinical information systems. The transmission of the OH-CCD between clinical information systems can be achieved using existing healthcare transport standards including FHIR, Direct, IHE and HL7 (<https://www.himss.org/library/interoperability-standards/transport-standards>) & IHE Secure Exchange of Dental Information: http://www.ihe.net/uploadedfiles/documents/dental/ihe_dent_suppl_sedi.pdf)

3.0 Normative References

The following standards contain provisions, which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. Since all standards are subject to revision, parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent edition of the specification or standard listed.

- HL7 C-CDA (HL7 Implementation Guide for CDA® Release 2: IHE Health Story Consolidation, Release 1.1 - US Realm) :
http://www.hl7.org/implement/standards/product_brief.cfm?product_id=258
- HL7-Messaging standards HL7 V2.x:
http://www.hl7.org/implement/standards/product_brief.cfm?product_id=146
- Center for Disease Control and Prevention (CDC), NUCC Provider Codes- Code System Details
<https://phin.vads.cdc.gov/vads/ViewCodeSystem.action?id=2.16.840.1.113883.6.101>
- SNOMED International, SNOMED CT, <http://www.snomed.org/>

- World Health Organization, ICD 10, <http://apps.who.int/classifications/icd10/browse/2016/en>
- Regenstrief Institute, LOINC, <http://loinc.org/>

4.0 Background

Patient information is the most critical resource in the healthcare field. To achieve the maximum benefit, improve the overall health of our patients and improve patient/provider safety, the information in the patient's healthcare records should be available to the dentists, specialists and other healthcare personnel and organizations at the point of care delivery in an accessible, standardized and structured format.

4.1 Principal Models in Developing Clinical Information Systems

An important feature of any health information system is its ability to not only capture the patient information accurately and completely in a structured manner, but also to support the key information exchange among the patient's healthcare team, syntactically and semantically. To achieve interoperability there needs to be three types of principal models for the design and development of clinical information systems (See **Figure 1**) [1, 2]:

- a.** Information/Data models represent the structure and relationship of the information to be stored in any system. Examples of such models are Health Level 7 Reference Information Model [3], American National Standards Institute/American Dental Association Specification No. 1000: Standard Clinical Data Architecture for the Structure and Content of an Electronic Health Record [4];
- b.** Terminology/Ontology models represents the meaning of the information that is stored within any systems. Example of such models are Systematized Nomenclature of Dentistry (SNODENT) [5, 6] and Systematized Nomenclature of Medicine – Clinical Terms (SNOMED-CT) [7]; and
- c.** Inference/Problem solving models serves in decision support and represents the consequence and actions which follow from what is stored within the system. Examples of such models are Medical Logical Modules (MLMs) [8], and Prodigy [9].

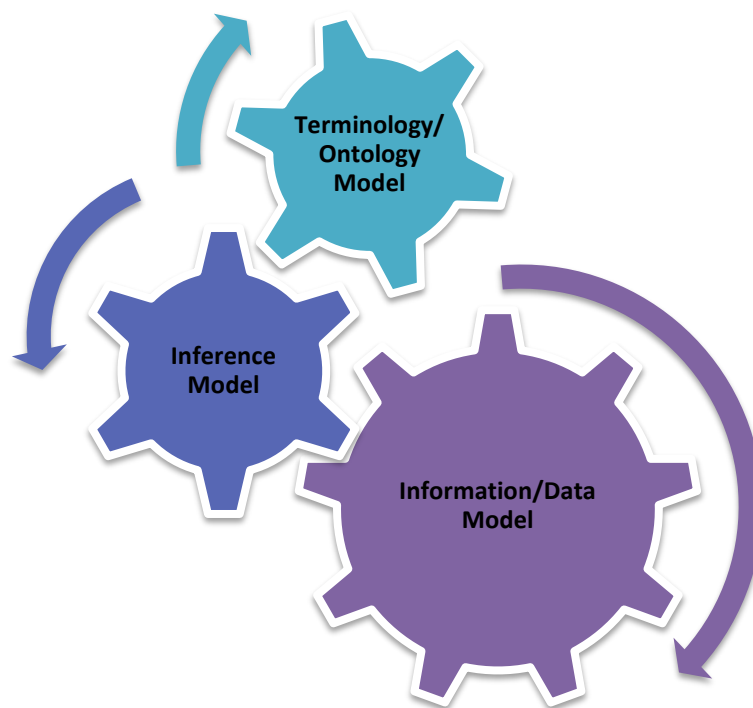


Figure 1: Three different types of principal models to achieve interoperability in clinical information systems

4.2 Health Information Exchange Standards

4.2.1 ASTM E2369 Standard Specification for Continuity of Care Record

In 2004, the American Society for Testing and Materials (ASTM) successfully balloted a landmark standard, the ASTM E2369 Standard Specification for Continuity of Care Record (CCR) [10]. The CCR is a XML-based standard established for clinical data exchange specifically needed for multiple practitioners to best deliver quality care in the case at hand. The CCR is a core data set of the most relevant administrative, demographic, and clinical information facts about a patient's healthcare, covering one or more healthcare encounters. It provided a means for one healthcare practitioner, system, or setting to aggregate all of the pertinent data about a patient and forward it to another practitioner, system, or setting to support the continuity of care.

4.2.2 Health Level 7 Clinical Document Architecture

Prior to 2007, the electronic data exchange of clinical data could be achieved by formatting the patient information from the health records either in the ASTM CCR format or the HL7 Clinical Document Architecture (CDA) [11]. The CDA is also a XML-based standard used for clinical document exchange developed by HL7. The main difference CCR and CDA is that the CCR uses only specified XML code *and does not support narrative text (free-text)*, and it is not electronically acceptable by all clinical information systems. Based on the purpose of the document, there are different CDA **document templates** that define

the clinical information. Each type of CDA **document template** includes a Document Header and a Document Body. The top of the document consists of the **header template** that includes the metadata such as author of the document, encounter time and location and patient demographics. Also referenced in the header are many **data type templates** which defines common set of constraints e.g. US Realm and Time which include a set of common constraints for recording time. The clinical information and any additional constraints on the Document Header is included within the Document Body. The Document Body consists of **section templates** that contain similar clinical concepts (e.g. Allergies, Medication, Problem List templates) which are represented as individual clinical statement using coded data elements using **entry templates** (e.g. 'Allergy to Penicillin' coded in xml under the Allergies **section template**). The **section** and **entry templates** are used to structure the key clinical information within the CDA document and are reusable across the different CDA **documents templates**. **Figure 2** illustrates the structure of the CDA document template and different template types within.

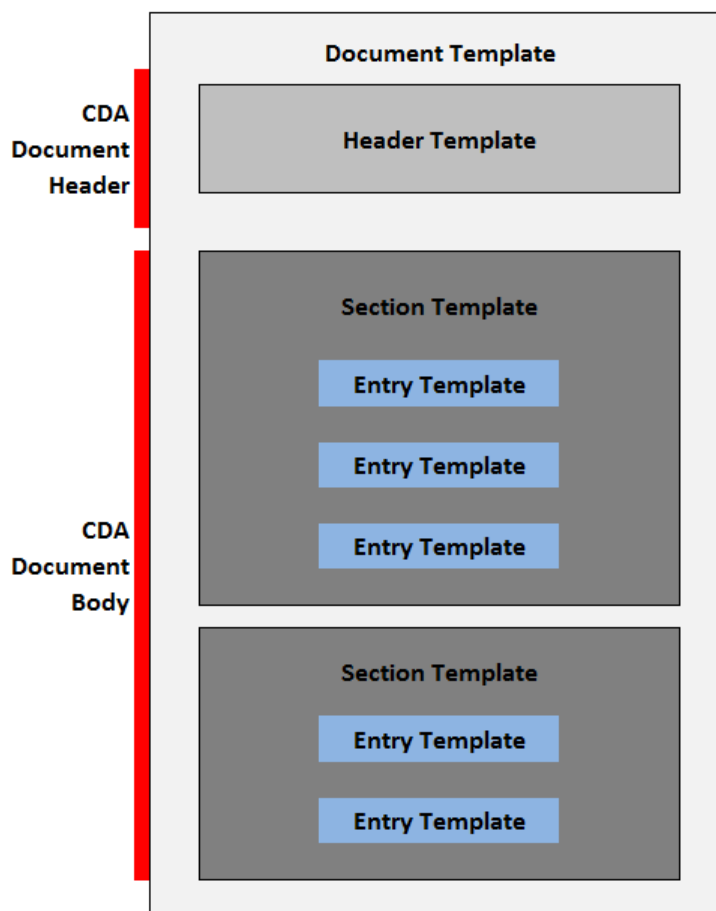


Figure 2: Structure of the CDA Document Template - Header, Section and Entry Template

4.2.3 Health Level 7 and ASTM International Continuity of Care Document

In 2007, a collaborative effort geared towards harmonizing the two separate yet closely related interoperability standards (CCR and CDA) was undertaken by ASTM International and HL7. This joint consolidation effort resulted in the development of the Continuity of Care Document (CCD) standard that was endorsed by the Healthcare Information Technology Standards Panel (HITSP) as the harmonized format for the exchanging of key clinical information including patient demographics [12]. The CCD resulted from the representation and mapping of CCR data within the CDA elements. In June 2008, CCD was endorsed by the Certification Commission for Health Information Technology (CCHIT) as part of their EHR certification requirements.

4.2.4 Health Level 7 Consolidated - Clinical Document Architecture

In 2011, HL7 balloted and approved a Consolidated-Clinical Document Architecture (C-CDA) implementation guideline [13] which reflected a harmonization effort to consolidate multiple approaches for documenting the CDA template by the different Standard Development Organizations (SDO) like HITSP, HL7, Integrating the Healthcare Enterprise (IHE) and others. The C-CDA implementation guide defines nine different types of commonly used CDA Documents Templates which includes the CCD, 60 Section Templates and 82 Entry Templates. The Documents Template defines the CDA document type (e.g. CCD), the Section Template defines structure of the data within the specific section (e.g. Vital Signs) and Entry Template defines structure of the specific healthcare facts or observations within the section (e.g. Systolic Blood Pressure of 120 mm of Hg). **Table 1** represents the nine different types of CDA Document along with the 17 sections within the CCD.

Table 1: CDA Document Types and CCD Sections

Consolidated CDA implementation guide defines nine different types of CDA Documents	CCD Document Template with its 17 Section Templates
1. Continuity of Care Document (CCD) → 2. Consultation Notes 3. Discharge Summary 4. Imaging Integration, and DICOM Diagnostic Imaging Standards 5. History and Physical 6. Operative Note 7. Progress Note 8. Procedure Note 9. Unstructured Documents	1.0 Header 2.0 Purpose 3.0 Problems 4.0 Procedures 5.0 Family history 6.0 Social history 7.0 Payers 8.0 Advance directives 9.0 Alerts 10.0 Medications 11.0 Immunizations 12.0 Medical equipment 13.0 Vital signs 14.0 Functional status 15.0 Results 16.0 Encounters 17.0 Plan of care